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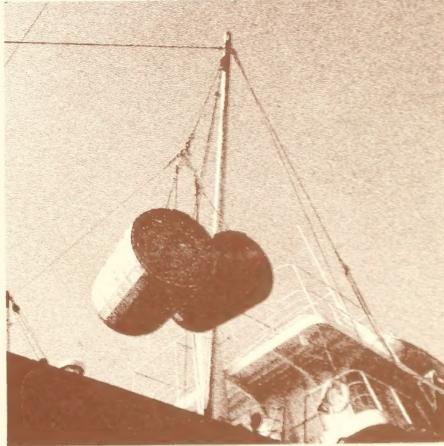
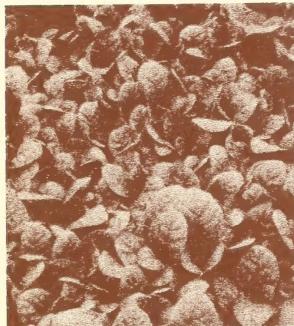
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Tobacco in the United States



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This publication has been compiled to fill a need for a general summary of the various phases of tobacco production and marketing in the United States and Puerto Rico.

The material has been taken from a variety of

publications and updated as required. Additional comments have been included, based on first-hand observations and experience by USDA marketing specialists and contributions from tobacco industry sources.

PREFACE

Tobacco is a commodity that is of major importance to United States agriculture and business. It usually ranks fifth among field crops in cash receipts to farmers, and is fifth in value among agricultural export classifications. It is a

major source of revenue for Federal, State, and local governments. (Receipts totaled over 6.2 billion dollars for the fiscal year 1977-78). Consumer expenditures for tobacco products in Calendar year 1977 were 17.1 billion dollars.

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Revised February 1979



Sir Walter Raleigh's experiments with tobacco helped establish a market for the tobacco grown at Jamestown.

The true and
lovely portraiture
of the Honourable
S. Walter
Raleigh.



Raising tobacco in the Colonies

TOBACCO IN THE UNITED STATES

I. HISTORICAL SKETCH

Tobacco is one of the products given to the world by the natives of the Americas. Columbus, on his first voyage to the New World, found the natives using tobacco in the forms common today—smoking, chewing, and snuff. Early records show that they also understood the essential features of modern production, including topping and suckering the plants, and the distinctive drying processes, now known as air-curing, sun-curing, and fire-curing. Facts regarding the introduction of tobacco to the Europeans, the attention given it in the literature of history, poetry, and romance, and its pervasive influence in the social and economic affairs of mankind have made this crop unique among the products of the soil.

The rapid expansion of tobacco production over the world was phenomenal. By 1531, less than 40 years after the discovery of America, Spaniards were cultivating the crop commercially in the West Indies; by 1560, it was being grown in Europe as an ornamental plant and for its medicinal qualities; by 1580, its commercial culture had extended to Cuba and Venezuela, and by 1600, to Brazil. By 1605, mariners and traders had introduced it into China, Japan, South Africa, and many other countries.

History records that John Rolfe began commercial cultivation of tobacco at the Jamestown colony and, in 1612, a small shipment was made to England. The tobacco that settlers found growing in the Indian villages along the James and Rappahannock rivers and other parts of Tidewater Virginia was a strong type belonging to the species *Nicotinia rustica* L., believed to have originated in Mexico or Central America. English merchants preferred "Spanish Leaf," a milder and more aromatic variety of the species *Nicotinia tobacum* L.; which had been used in Europe and Britain 20 years before the Virginia colony was founded. The English settlers soon acquired seeds of the desirable varieties, and production increased rapidly. By necessity it became the leading item of commerce with England, for it was the only commodity the settlers could produce in exchange for essential manufactured products.

Records of the era prove that tobacco was such

a factor in the colony's economy that John Rolfe grew it in the streets of Jamestown. Specified quantities were required to secure the passage of wives and provide salaries for the clergy. Without tobacco the colony could not have survived. During the Revolutionary War, tobacco was used as collateral for loans secured by Benjamin Franklin from France to finance the war.

In colonial days, virtually the only market for tobacco was overseas. Usually the product was packed in hogsheads and consigned to an English merchant. It was sold on a commission basis, and manufactured goods were given in return. This system proved unsatisfactory to the planter, because of the delay in the transaction and the risk of dealing with unscrupulous merchants. During the eighteenth century, another method of marketing came into general use. The crop was sold at the farm to a local British agent, who maintained a "store." Here the planter could secure the manufactured items he needed. This system was more satisfactory and became the most popular way of marketing.

As tobacco culture was expanded into new territories, it was seen that changes in soil and climate caused important differences in the characteristics of tobacco. These differences in the properties of the tobacco leaf greatly affected its suitability for use in manufactured forms. Through gradual evolution, tobacco culture has become highly specialized. Each district produces a special type of leaf particularly adapted for certain uses: cigarettes, cigars, smoking or chewing tobacco, and snuff. It has been found that some types of tobacco can be produced only under certain conditions of soil and climate, by using certain varieties, and by following special methods in growing and curing the crop.

Currently, more than 500,000 farm families in the United States and Puerto Rico grow tobacco. Total annual gross income to farmers from the 1977 crop was \$2.3 billion. Tobacco growing requires a great deal of labor. A farmer and his family, (or hired workers), must put in about a total of 280 hours or more to raise one acre of tobacco. This may be contrasted to the average amount of labor—about 3 hours—needed to raise an acre of wheat.

II. CLASSIFICATION

Since the various tobacco products require leaf of different characteristics, a standard system of classification is necessary. This is used for orderly marketing and distribution of the leaf from farmers to manufacturers and dealers. The U.S. Department of Agriculture (USDA) designates six major classes of tobaccos grown in the United States. The first three classes are named on the basis of the method used in curing; the last three, which are all cigar leaf classes, on the basis of the principal use for which they are produced.

Tobaccos grown in the United States are listed below, according to USDA classification.

Each class is made up of two or more different types. Within the flue-cured class, individual types can no longer be easily identified and the type designation usually refers only to a marketing area.

Each type is further subdivided into grades. These grades are related to stalk position, quality, color, and other characteristics of the leaf, and provide a common language understood by both buyer and seller. The official U.S. standards for tobacco are playing an increasing role in world trade since several major buyers now require certification of their American purchases.

CLASSIFICATION OF TOBACCO GROWN IN THE UNITED STATES

Class	Type	Major Producing States
1. Flue-cured	11 Old and Middle Belt	Va. and N.C.
	12 Eastern Belt	N.C.
	13 Border Belt	S.C. and N.C.
	14 Georgia and Florida Belt	Ga., Fla., and Ala.
2. Fire-cured	21 Virginia	Va.
	22 Eastern District	Ky. and Tenn.
	23 Western District	Ky. and Tenn.
3. Air-cured (a) Light	31 Burley	Ky., Tenn., Ohio, Ind., Va., N.C., W. Va. and Mo.
	32 Southern Maryland	Md.
	35 One Sucker	Ky. and Tenn.
	36 Green River	Ky.
(b) Dark	37 Virginia sun-cured	Va.
	41 Pennsylvania Seedleaf	Pa.
	42-44 Ohio filler	Ohio
4. Cigar-filler	46 Puerto Rican filler	P.R.
	51 Connecticut Broadleaf	Conn.
	52 Connecticut Havana Seed	Conn. and Mass.
	54 Southern Wisconsin	Wis.
5. Cigar-binder	55 Northern Wisconsin	Wis.
	61 Connecticut Shade	Conn. and Mass.
	62 Georgia and Florida Shade	Ga. and Fla.
7. Miscellaneous Domestic	72 Perique	La.

Description of Tobacco Classes

Following is a brief description of tobacco classes, covering some of the elements of quality, volume of production and exports, and principal uses.

Class I — Flue-cured makes up about 60 percent of tobacco produced in the United States today with annual production of more than 1 billion pounds (453 million kilograms). Its name

comes from the metal flues of the heating apparatus originally used in curing barns. It is yellow to reddish-orange in color, thin to medium in body, and mild in flavor.

Flue-cured tobacco is the principal export type, accounting for more than 75 percent of all tobacco leaf exported. Currently about 500 to 550 million pounds (226 to 249 million kilograms), or two-fifths, of the flue-cured crop is exported annually.

Cigarettes account for 95 percent of flue-cured usage in the United States, with smoking and chewing tobacco accounting for the remainder.

Class 2 — Fire-cured is medium to heavy in body, light to dark brown in color, and strong in flavor. It acquired the name because of the smoky flavor and aroma received from "firing" over open fires in the curing barns. It is used for making snuff, roll and plug chewing tobacco, strong cigars, and heavy smoking tobacco. Production currently amounts to 40 million pounds (18 million kilograms) annually, about half of which is exported.

Class 3—Air-cured is cured under natural atmospheric conditions, usually without the use of supplementary heat, except to prevent damage in damp weather.

(a) **Light air-cured** is normally very thin to medium in body, light tan shaded toward red to reddish brown in color, mild in flavor, and is used chiefly in making cigarettes. It is usually combined with flue-cured and small quantities of imported tobacco to form the blends for cigarette manufacture. Each of the two types, burley and Maryland, has special characteristics.

Burley, on an area basis, is the most widely grown single type in the United States. It is produced in eight principal States, and about 630 million pounds (285 million kilograms) are produced annually—more than one-fourth of all the tobacco grown in this country.

Burley is desired for cigarette blends because of its flavor and aroma. Cigarettes currently account for over 90 percent of the domestic consumption of burley. In addition to its use in cigarettes, it also goes into the manufacture of pipe tobaccos, and plug and twist chewing. Exports have ranged between 90 and 115 million pounds (41 and 52 million kilograms) annually in recent years.

Maryland is usually considered to have ideal burning qualities for use in cigarette blends. Production has averaged about 30 million pounds (14 million kilograms) annually in recent years. Exports have been declining and now total 8 to 12 million pounds (3.6 to 5.4 million kilograms) a year.

(b) **Dark air-cured** is medium to heavy-bodied and ranges from light to medium brown in color. It is used in the manufacture of the same products as fire-cured types—mainly chewing tobacco and snuff, but also to some extent for smoking tobacco and cigars. Annual production is decreasing, and now amounts to 14 to 20 million pounds (6 to 9 million kilograms). Exports are about 2 million pounds (0.9 million kilograms) a year.

Classes 4-6, cigar leaf types, are classified according to the use of the tobacco in cigars—as filler, binder, or wrapper. However, wrapper types may be used for all three purposes, and some



A field of fire-cured tobacco ready for harvest.



Flue-cured tobacco is inspected by a farmer and a USDA employee.



Burley tobacco in flower.



Cigar-wrapper tobacco is grown under cheese cloth. The lower leaves of this tobacco have already been harvested.

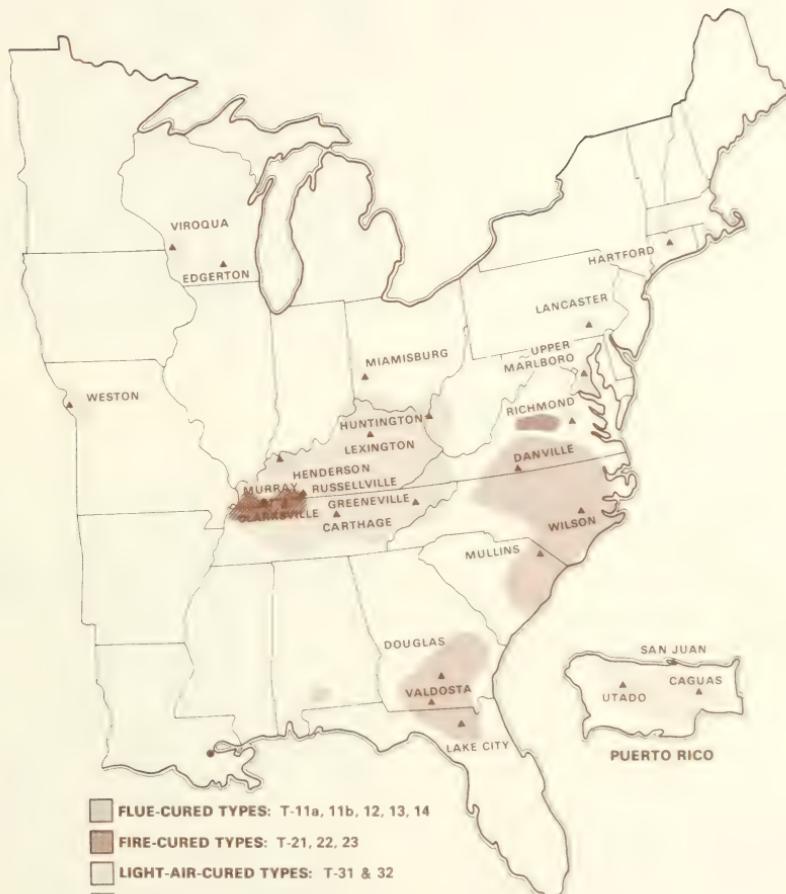
grades from any type may go into loose-leaf chewing. Cigar tobaccos are air-cured with the exception of a small portion of the wrapper types which is cured with heat to produce a greenish leaf commonly known as Candela leaf. After many years of decline, production is currently around 60 million pounds (27 million kilograms). Exports are around 3 million pounds (1.4 million kilograms).

The **cigar-filler** types of tobacco are of medium to heavy body. Their main use is in the core or body of the cigar. For this purpose, the principal factors to be considered are flavor, aroma, and burning quality.

The **cigar-binder** types were originally used mainly for binding the bunched filler into the form and shape of the cigar. Natural leaf binders must have good burning quality, aroma, and elasticity. However, practically all cigars now use a reconstituted tobacco sheet for the inner binder. As a result, loose leaf chewing tobacco is now the principal outlet.

Cigar wrappers are the most difficult and expensive of all tobaccos to grow. They are used primarily for the outside cover on cigars, and leaves must be elastic, free of injury, uniform in color, and have good burning qualities. They should also be very thin, smooth, and of fine quality. In order to produce leaves with such properties, it is necessary to protect them against the sun and extremes of weather. Many of the fields are enclosed with a framework covered with cheese cloth. This cloth screening filters the sunlight and creates an artificial environment favorable to the specialized product desired. These types are commonly called "shade-grown" as descriptive of this method of cultivation. While expensive cigars continue to be made with a natural wrapper, the use of reconstituted tobacco sheet is increasing.

In addition to the major classes, some "miscellaneous" types of tobacco are grown. The most important of these is Perique (type 72). It is grown on a narrow strip of land in St. James Parish in Louisiana, and comprises only a very small part of total United States production. This unique type of tobacco is noted for its pleasing aroma. Small quantities are used in blends in the manufacture of fancy smoking tobacco. Annual production is around 100 thousand pounds (45 thousand kilograms), and a large percentage is exported.



Tobacco producing areas

III. CULTURE

The various types of tobacco are grown in well-defined localities where soil and climate have been found to yield a product with properties desired for manufacture or export. The methods of growing and handling are also determined by the kind of leaf required by the trade.

Seeding

Tobacco seedlings are grown in seedbeds of sterilized soil covered with either cheese cloth, a plastic or a new cover of synthetic material. The seeds are also so tiny that 1 ounce contains about 300 to 450 thousand seeds. A sixth to an eighth of an ounce (4 to 6 grams) of seed is enough to sow 100 square yards (84 square meters) of seedbed, and will furnish enough plants to set 1 to 4 acres (0.4 to 1.6 hectares) in the field. To assure adequate plants at the proper time, rule of thumb is to sow 50-100 square yards (42-84 square meters) of seedbed for each acre (0.4 hectare) to be set in the field.

Seeding may be done with a mechanical seeder or by mixing the seed with clean sand, pulverized fertilizer, ashes, or lime before sowing. Germination begins when the temperature reaches about 65°F (18°C). The plants are ready for transplanting to the fields when they have developed 6 to 8 leaves and are 6 to 8 inches (152.4 to 203.2 millimeters) high.

Soils and Fertilization

Tobacco is a very sensitive plant, and proper fertilization is an important factor in producing the specific kind of leaf desired. The farmer must know the exact kinds and amounts of fertilizers for his particular kind of soil. For instance, the quantity of nitrogen, which stimulates rapid growth, is of critical importance for flue-cured, but is not so important for burley and Maryland. A liberal supply of potash, in the form of sulfate, carbonate, or nitrate, reduces the susceptibility to bacterial leaf spot diseases, and also improves the burning quality of the tobacco. The excessive use of chlorides in any form impairs the burning quality. Barnyard manures, when available, are used to considerable extent in some types, such as burley and Wisconsin, but very sparingly in the flue-cured areas. The development of the plant is seriously affected if any one of the chemical elements necessary for its growth is lacking in the soil.



These tobacco seedlings are ready to be transplanted.



Transplanting tobacco by machine.

Transplanting

Transplanting occurs from late March to early May in Georgia and Florida, South Carolina, and eastern North Carolina, and from May through June in other growing areas. Just before the plants are transplanted, the final field preparation is made by repeated disk ing and rolling or harrowing, and smoothing and furrowing the surface soil. Sometimes the field is left level, and other times it is ridged and the plants set on the ridges. Ridging is the prevailing practice in flue-cured and, to some extent, in the dark types, and level culture is chiefly used in the cigar types, burley and Maryland.

Two methods are used in transplanting the tobacco seedlings into the field: (1) By power-drawn transplanting machines; (2) by use of a hand transplanter.

(1) The **power-drawn transplanting machine** is the most widely-used method for planting. It is operated by a driver, and carries two, four, or eight persons on "setters," who ride the machine and alternate in placing or guiding the plants into the mechanism which spaces them at the proper intervals in the row. The machine opens the furrow, dumps a measured quantity of water, and draws the soil about the roots of the plants.

(2) The **hand transplanter** is a device of light-weight metal, about $3\frac{1}{2}$ feet (1.1 meter) in length, cone-shaped at the bottom, and with a handle at the top. It carries a water supply, and has an opening through which the plant is dropped. It makes a hole in the soil, and with one operation of the handle, drops the plant, and releases the proper quantity of water. The worker sets the plant by pressing the soil around it with his foot.

The **spacing** of plants in the fields differs widely among types and classes. The width between rows averages 3 to 4 feet (0.9 to 1.2 meters), with the plants 12 to 24 inches (304.8 to 609.6 millimeters) apart in the rows. This spacing allows for 5,000 to 11,000 plants per acre.

Cultivation

The cultivation methods of tobacco crops are similar to those practiced for other row crops. The main purpose is to keep the soil loose and eliminate weeds and grasses. The soil must be well drained and aired. Chemical herbicides are now widely used to control grasses.

Topping—When the plant begins to produce flowers, it is topped by breaking or cutting off the upper portion of the plant at about the third leaf below the flower. This allows the remaining leaves to draw additional nutrients and thus become larger, thicker, and heavier. Upon removal of the flower, lateral buds or "suckers" begin to develop and grow in the leaf axils in an

attempt to replace the terminal bud. Since the purpose of topping is to increase the size and weight of the leaves, these suckers must be removed at intervals either by hand or controlled by the use of chemicals. The time and height of topping can have great effects on the yield and quality of the cured leaf and are among the most critical decisions the grower must make.

The number of leaves remaining on the plant after topping usually varies from 18 to 26 in the flue-cured, Maryland, burley, and cigar types, and about 14 in the fire-cured and dark air-cured types.

IV. HARVESTING AND CURING

Harvesting

When the crop is mature, 60 to 90 days after transplanting, it is harvested by one of two methods: (1) by "priming" in which the leaves are picked individually from the plant as they ripen; or (2) by "stalk-cutting," in which the entire plant or stalk is cut.

Much of the success in curing tobacco depends on its being harvested at just the right stage of maturity—neither too ripe nor too green. This critical point in the production of good quality tobacco occurs when the leaves begin to turn a yellowish color. It takes an experienced eye to recognize the proper stage of ripeness. Such experience is gained only through long years of growing and harvesting tobacco crops.

The harvesting of tobacco is still largely accomplished by hand labor. Mechanical harvesters are now commercially available for flue-cured tobacco, but the costs and reliability of such specialized machines prohibits their widespread use on small acreages.

(1) **Priming—Flue-cured and cigar wrapper** tobaccos are harvested by the priming method. **Puerto Rican filler** is also harvested almost



Flue-cured tobacco is harvested by removing individual leaves. This priming platform carries workers through the fields.



A field of flue-cured tobacco is harvested by machine.



During harvest burley tobacco is speared onto sticks. The sticks of tobacco will be hung in the barn for curing.

entirely in this way. Beginning at the bottom, two to four leaves are picked from the stalk at a time. Priming occurs at regular intervals to get all the leaves at the right stage of ripeness.

Flue-cured leaves are either attached to wooden sticks for conventional curing barns or placed in metal racks for "bulk" curing. String is used to secure the leaves onto the 4½ foot (1.4 meters) wooden sticks. Mechanical stitching machines have largely replaced the hand operation in stringing tobacco.

Cigar wrapper leaves are handled with great care. They are strung onto 4½ foot (1.4 meters) sticks by attaching a string at one end and running a threaded needle through the base of the leaves (arranged in pairs, back to back and front to front) for the length of the stick (about 15 to 22 pairs), and fastening it at the other end. In the Puerto Rican type, no sticks are used. The string is sewn through the butt of each leaf (about 40 to 50 leaves to a string) and then tied to the barn poles.

(2) **Stalk-cutting**—Burley, Maryland, and fire and dark air-cured, and most cigar leaf tobaccos



Burley tobacco sticks line the field just before they are moved to a curing barn.



Maryland tobacco is shown as it is speared onto sticks.



A farm worker primes cigar-wrapper tobacco.

are harvested by the stalk-cutting method. The entire plant is cut close to the ground with a special type of hatchet or knife. Usually all plants in the field are harvested at the same time, but some less mature areas may be left and cut later. After being cut, five or six stalks are speared onto sticks 4½ feet (1.4 meters) long, and left in the field a day or so and allowed to wilt, so they will lose water and not break in handling.

The density of the tobacco on the sticks (or the string, in the case of Puerto Rican) is an important fact in the curing process, as satisfactory curing is made difficult by crowding. Space must be left between the plants or leaves for proper circulation of air.

Along with chemical changes that take place during the curing process, there is also a loss in weight from evaporation of a large quantity of the water contained in the leaf when it is harvested. Fresh leaf, as it goes into the curing barn, usually contains about 85 percent water, which is reduced to about 15 percent in curing. Therefore, about 6,500 pounds (2,925 kilograms) of green leaf will be required to yield 1,000 pounds (453 kilograms) of cured leaf, and over 4,000 pounds (1,800 kilograms) of water will be lost in the curing process.

Curing

There are three basic methods of curing tobacco:

(1) **air-curing**—in which the tobacco is primarily cured under natural weather conditions, but heat may be used to some extent;

(2) **flue-curing**—in which the tobacco is cured by heated air at gradually increasing temperatures, but must not be subjected to smoke or odors;

(3) **fire-curing**—in which the tobacco is mostly cured with wood fires and the smoke comes in contact with the leaf.

Air-curing (burley, Maryland, dark air-cured, and cigar types)

Type of barn—Barns used for air-curing tobacco are 30 to 40 feet (9.1 to 12.2 meters) wide and up to 300 feet (91.5 meters) in length. Boards on the outside of the barn are usually vertical with about every third board hung on hinges to function as a ventilator.

The barn has driveways and doors large enough to allow a wagon or truck to pass through easily. The interior consists of a framework of poles for supporting the laths on which the tobacco has been placed. The spaces between the



Workers hang cigar wrapper leaves in a curing barn.



Air-curing barns are constructed so that sticks of tobacco can be hung at different levels.



Freshly harvested flue-cured tobacco is loaded into a bulk-curing barn.

poles are called tiers. Barns are built 3 to 4 tiers high. The first tier of poles is at least 9 feet (2.7 meters) from the ground, so that the tobacco on the bottom tier clears the ground by at least 3 feet (0.9 meters). The other tiers are 4 or 5 feet apart (1.2 to 1.5 meters). The tier poles are usually about 16 feet (5 meters) long, and strong enough to carry 800 pounds (362.68 kilograms).

Air-curing operation—Most air-cured tobaccos are harvested by stalk-cutting. Shade-grown wrapper and Puerto Rican filler are harvested by priming. The nutrients that the plant accumulates before harvesting help it to live several days after being cut. When they are exhausted, the leaf dies and is then nearly cured. Air-curing tobacco forces the leaves to go through a process of gradual starvation under proper conditions.

The time required for completely curing stalk-cut tobacco varies, depending on weather conditions, from 5 to 8 weeks for the cigar types, and from 4 to 6 weeks for burley, Maryland, and the dark air-cured types.

Although the stalks may still be quite green, the cure is finished when the midrib (central vein of the leaf) is dried out and free of sap. The amount of supplementary heat required during the curing period varies considerably with the weather, and is particularly important under cold or excessively wet conditions.

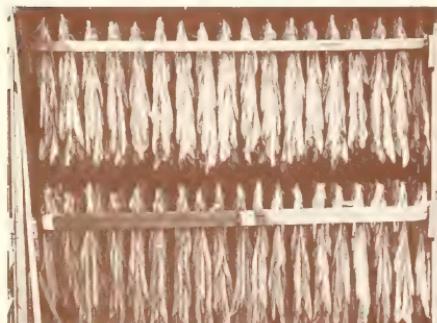
Supplementary heat is almost always used in curing shade tobacco, essentially to protect the product, and to maintain the temperature at a favorable level rather than to elevate it. A small amount of cigar wrapper is cured under high heat to produce a leaf of greenish color. This is known as fire-cured or candela-cured leaf.

Flue-curing (flue-cured types)

Type of barn—Two types of barns are used for curing flue-cured tobacco, the conventional barns and the more recently developed bulk curers. The conventional barns are usually square with inside measurements 16, 20, or 24 feet (4.8, 6.1, or 7.2 meters), and contain tier poles spaced about 4 feet (1.2 meters) horizontally and 26 inches (660.4 millimeters) vertically. The barns have solid walls with ventilation provided at the top and bottom.

Originally, flue-curing barns were heated with wood-fired furnaces of stone or brick built partly outside the barn at ground level. Metal flues from the furnace extended around the floor of the barn radiating heat for curing the tobacco and to carry the smoke and combustion odors outside the barn. The next development was oil-fired furnaces to replace wood. Most conventional barns now use oil-burning heaters or open-flame gas heaters located inside the barn.

Stalk-cut tobacco hangs in a curing barn.



Sides of a typical air-curing barn can be opened at various points to adjust air circulation.

Flue-cured growers are converting to the "bulk curing" system. The curing barn is a specially constructed wood or metal building with built-in devices for more precise temperature, humidity, and ventilation control. The curing procedure is the same as in the older barns except that the tobacco is very closely spaced on special metal racks instead of sticks. Fans are used to force the heated air through the tobacco. The conversion to bulk barns is proceeding much faster than the shift to mechanical harvesters.

Flue-curing operation—Curing barns are completely filled to insure uniformity in the curing. Heat is applied to produce gradual changes in the leaf, particularly as to color and moisture content. Curing may be considered to take place in three stages: (1) yellowing, (2) drying of the leaf, and (3) drying of the stem. (1) In the yellowing stage, the heat is maintained at around 90° to 100° F (32.1 to 37.8° C), for 24 to 40 hours under average conditions; (2) it is then moved up fairly rapidly to 130° to 140° F (54.4 to 60° C) to dry the leaf and fix the color, which takes from 30 to 36 hours; (3) and then it is gradually raised to 160° F (70.1° C) and maintained at this level until the stems are thoroughly dry. The whole curing process is completed in 5 to 7 days.

Fire-curing (fire-cured types)

Type of barn—The old type of barn used for fire-curing was built of logs and the cracks daubed with mud. These barns were small, but generally high enough for 5 sets of tier poles. Modern barns are larger frame buildings with passageways for loaded wagons or trucks.

Fire-curing operation—Fire-cured tobacco is harvested by stalk-cutting. Usually no heat is required during the first stage of the curing, in which the leaf begins to yellow. After the tobacco



Conventional curing barns that are used for flue-cured tobacco.



Bulk-curing barns also are used in flue-cured tobacco areas.

has been in the barn from 3 to 5 days, slow fires of hardwood are started on the floor and temperatures are kept low until the leaf is completely yellowed. Temperatures are then increased and the higher heat maintained until the leaf tissue is well dried. The fires are maintained for 3 to 10 days in some barns or production areas, and 10 to 40 days in others.

The main objective in fire-curing is to give the leaf a special smoky taste and aroma, which is accomplished through contact with the smoke from the open fires. The proper combination of heat, humidity, and ventilation are necessary to prevent injury to the leaf, and to protect it against mold and discoloration. Smoke coming from a barn being fired produces a colorful sight in the fire-cured area but caution is required to keep the fires under control.

Curing Perique tobacco—the curing process is unique. The entire plant is cut, a nail is driven at an angle through the butt of the stalk, and the plant is hung from wires stretched across the curing barn. After 8 to 14 days, when the leaves have dried and turned brown, they are stripped from the stalks, formed into small twists, and packed in casks under great pressure until they turn black. Every few days during the first month, the tobacco is taken out, loosened, and put back again under the pressure. It is allowed to ferment for about 9 months under this pressure and is then ready for sale. The process gives Perique its characteristic aroma.

V. PREPARATION FOR MARKET

When fully cured, the leaf is too dry and brittle to be handled without serious damage. However, tobacco leaves easily absorb moisture from the air under warm, humid conditions. Such weather is often spoken of as a "tobacco season," and when the leaf is soft or pliable enough to be handled without breaking it is said to be "in case" or "in order."



Cured tobacco must be pliable before leaves are removed from stalks and sorted for market.



Flue-cured tobacco is bundled for market with the aid of a packing mold. Bundles of leaves are wrapped in burlap sheets.



Fire-cured curing barn.



Tobacco auction warehouse.

Air-cured Types (except cigar)

In these types the stalks are removed from the sticks and arranged in piles or "bulks" in such a way that the tobacco will retain moisture for several days. The leaves are pulled from the stalks and tied into "hands" of 20-40 leaves. Sorting and grading takes place during this process based on stalk position, color, quality, and size so that individual hands are grouped into different grades. The graded tobacco is then bulked down until time for delivery to market.

Air-cured Cigar types

The leaves of the stalk cut types are sorted and packed into rectangular bales as they are pulled from the stalk. Home-made box frames are used and the bales are wrapped with a heavy brown paper and secured with twine. The weight of a bale ranges from 40 to 60 pounds (18.14 to 27.22 kilograms). In these types there is very little sorting by grades.

The prime shade grown leaves are more carefully sorted and tied into hands prior to packing in wooden boxes for delivery to a packing house. All cigar types undergo some form of fermentation before they are ready for sale (see storage and aging, page 18).

Flue-cured Types

The priming method used in harvesting these types provides a rough grouping by stalk position since each priming is handled separately. As the leaves are removed from the barns, additional sorting may be done and then they are wrapped in burlap sheets and delivered to market.

VI. MARKETING

Around 97 percent of the tobacco grown in the United States is marketed by the auction method where the tobacco is displayed for sale in small individual lots. The remaining 3 percent, made up principally of cigar-leaf tobacco, is sold either directly on the farms or through farmer-owned cooperatives. A very small quantity is sold in the traditional wooden hogsheads.

The auction method began in Danville, Virginia, shortly before the Civil War. Following the conflict, the system came to be widely accepted throughout the rapidly-expanding flue-cured belt in North Carolina and Virginia. Auction marketing was introduced in the Kentucky and Tennessee areas at Clarksville, Tenn., in 1901.

Auction Method of Selling

Growers deliver their tobacco to the auction warehouse of their choice, where it is sold to the highest bidder. The bidders are buyers for tobacco products manufacturers both domestic and foreign and independent dealers who buy on orders for domestic and foreign tobacco products manufacturers or for future sales to these manufacturers. The auction system is of vast proportions, providing facilities for handling nearly 2 billion pounds (0.9 billion kilograms) of tobacco annually, mostly from July through February.

The length and period of the marketing season varies for the different types of tobacco, and, to some extent, from year to year. The selling begins when the Georgia and Florida flue-cured markets open in July and ends when sales in Maryland are completed in June of the following year. The

marketing seasons are so staggered that it is possible to find an auction sale in progress in some area almost any time during the year.

Markets are in towns or cities in growing areas where one or more warehouses sell tobacco at auction. In 1977, there were 673 warehouse firms operating in 175 auction markets in the United States. They are located in 12 states and sell 13 types of tobacco.

Warehouse Construction

The auction warehouse is designed to provide proper and uniform conditions for display and sale of farmers' tobacco. Important to warehouse construction is lighting. USDA regulations require that the tobacco be classed and graded under "proper light for correct determination of grade or other characteristics of tobacco." Natural daylight, as provided by sky lights, has always been regarded as the best source of lighting.

Artificial lights have been developed, which are satisfactory for grading and classing but their use is very limited.

Some of the largest buildings have an area as large as seven acres and can display as many as 7,000 lots of tobacco at one time. The floor is made of heavy planking, concrete, or asphalt with ample driveways for delivery by trucks or wagons. These driveways are usually 4 to 6 feet (1.2 to 1.8 meters) below the floor level for the convenience in moving the tobacco on or off the floor.

Before the Sale

Growers usually deliver their tobacco to the warehouse for sale on specified days through prior arrangements with the warehouse operator.

Delivery may be from several hours to several days before the sale depending on the method of warehouse operation. Flue-cured tobacco is delivered in burlap sheets and displayed for sale in lots weighing up to 250 pounds (113.2 kilograms). All other auction types use the traditional wooden tray, i.e., "basket", about 40 inches (916 millimeters) square, furnished by the warehouse. The individual "hands" of tied tobacco are arranged on the baskets to make distinctive displays. Weights of baskets containing tied tobacco vary from 50 to over 700 pounds (22.68 to over 317.52 kilograms).

The baskets or sheets are weighed and assigned a ticket with several carbon copies. This ticket shows the grower's name, basket serial number, warehouse name, and the weight in pounds. Spaces are also provided for the government trademark, buyer's name and trademark, and selling prices. After weighing, the sheets or baskets are moved on the warehouse floor and arranged in rows in preparation for the sale.



Flue-cured tobacco is delivered to market in burlap sheets.



Baskets of burley tobacco ready for auction in a warehouse.

Government Inspection and Market News Services

Shortly before the sale, a Federal inspector examines each lot of tobacco and grades it according to official U.S. standards. He enters the grade, date, and his initials on the sales ticket, which becomes the certificate of grade for that lot of tobacco. After the sale, data on grades and prices are collected from these tickets to form the basis for published market news reports. Current price reports are available to growers on the warehouse floors.

Inspection and market news services authorized by the Tobacco Inspection Act are in effect on all designated auction markets. The Act provides for free and mandatory inspection on auction markets designated by the Secretary of Agriculture. A market becomes eligible for designation on the basis of a referendum of growers selling on the market. Government grading and market news services aid the farmer by accurately describing his tobacco and enabling him to determine whether his bid price is a fair one.

The Auction Sale

The auction sales group is made up of (1) the auctioneer, (2) the warehouseman or his representative, who calls an opening bid, (3) a corps of buyer representatives (usually 6 to 8), known as a "set of buyers," and (4) the warehouse clerk who follows and records the details of the sale such as buyer's name and trademark and the price bid onto the basket ticket. Usually, a number of growers and interested spectators are observing the sale.



A USDA price recorder collects price information during an auction sale.

Tobacco Market News

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
Kentucky Department of Agriculture, Cooperating
333 Waller Avenue, Lexington, KY 40504 Tel. 252-1678

WEEKLY
Jan. 16, 1978

NO. 4
1977 CROP

Tobacco Market News

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
KY, NC, TN, VA & WV Depts. of Agri., Cooperating
333 Waller Ave. Lexington, Kentucky 40504

WEEKLY
Friday
Dec. 9, 1977

NO. 3
1977 CROP

Tobacco Market News

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
201 South 5th Avenue, Dillon, S. C.
S. C. and N. C. Departments of Agriculture, Cooperating

WEEKLY
August 18, 1978

NO. 4
1978 CROP

Tobacco Market News

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
1306 Annapolis Drive, Raleigh, NC
Virginia Department of Agriculture and Commerce, Cooperating

WEEKLY
January 23, 1978

NO. 3
1977 CROP



A Federal-State market news reporter releases information on price, supply and demand to news media.

Tobacco Market News

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
1206 N. Patterson Street, Valdosta, Ga., Tel. 247-3410
Georgia and Florida Departments of Agriculture, Cooperating

WEEKLY
FRIDAY
AUGUST 11, 1978

NO. 4
1978 CROP

Tobacco Market News

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
Kentucky Department of Agriculture, Cooperating
333 Waller Avenue, Lexington, KY 40504 Tel. 252-1678

WEEKLY
Jan. 23, 1978

NO. 6
1977 CROP



Market news reports are distributed in many ways, including posting at auction warehouse.

The warehouseman or his representative starts the bidding. The auctioneer calls out the starter's bid, receives other bids, and announces the highest bid received and the buyer purchasing the lot.

Various quick signs are made by the buyers and accepted as bids by the auctioneer, and the auction sale moves along very rapidly. In the flue-cured district, the rate of sales is 500 lots per hour, and in burley, 360 baskets.

As soon as the sale is underway, laborers begin moving the auctioned tobacco off the floor and loading it on trucks to be taken to the processing facilities of the various buying companies.

A farmer may reject the bid price offered for any lot of his tobacco. He does by "turning" the ticket, that is, by folding it with a crease, tearing off a portion, or otherwise mutilating it. Such lots are usually "dressed up" and put back in line for later sale on the same warehouse floor. It is hoped that, at the second sale, it will be bid in at a higher price. However, the grower may take the tobacco to another warehouse or market.

The grower is paid for his tobacco by the warehouseman on the same day it is sold. The amount due on each lot is figured immediately after the sale. Selling charges are deducted and a check is issued the farmer against the warehouse account. Buyers usually settle with the warehouseman within a few days after the sale. Selling charges vary by types of tobacco, ranging from 3 to 6 percent of the gross value.

Country Sales—Fire-cured and Cigar Leaf

In recent years 30-50 percent of the fire-cured tobacco produced in the Kentucky and Tennessee area has been sold directly at the farms. In earlier years, this farm or "barn-door" buying of the leaf was practiced to an even greater extent.

In most of the cigar-leaf tobacco districts, farmers contract for the sale of their tobacco at the farm, a system known as "barn-door" marketing. This may be done any time during the



A USDA tobacco inspector grades tobacco in a flue-cured auction warehouse.



The auction sales ticket carries the buyer's name, grade of the tobacco, weight and the price bid for the lot.



Buyers move through a flue-cured auction warehouse bidding on tobacco.



The auctioneer leads a "set of buyers" for various companies through the fast-paced auction process.

growing or curing season. Buyers are cigar or chewing tobacco manufacturers or independent packers.

Although competitive bidding exists in the sense that various buyers inspect the tobacco and make offers, competition is not as apparent as in the auction method of sales.

The buyers travel through the producing districts during the growing season, and note the progress of individual crops, as well as the changes in the acreages and crop prospects, as compared with other years. In this way they keep themselves informed on the location of desirable crops.

Sales may be at a flat price per pound for the entire crop, or at separate rates per pound for different groups of grades.

Cigar wrapper is grown under many kinds of arrangements. Sometimes the buyer rents the land, hires the owner as foreman, and has him grow the tobacco for the buyer's account, or the buyer and the farmer each contribute certain specified items of cost and share in the proceeds in relation to this contribution. Some manufacturers grow tobacco on their own land. Sometimes a farmer who thinks he has an unusually fine crop and believes the prevailing market will improve, has his tobacco sorted, sweated, packed, and stored for sale at a future time.

The Hogshead Market

Before the "loose-leaf" auction system of sales was developed, growers packed their tobacco in hogsheads for delivery to commission agents. This was much the same procedure as was followed in the very early days of the country. Originally, the grower received a negotiable receipt for each hogshead delivered, before inspection and final sale. In the early 1800's the practice of sampling the hogsheads and allowing buyers to bid on these samples established the first form of sale by the auction system.

Today, the only such hogshead market in operation is the "closed-bid" auction at Cheltenham, Md., which handles a very small quantity of Maryland tobacco. The tobacco is delivered to the marketing association which operates as the commission agent. After the State inspector samples the hogsheads and affixes the State seal, the samples are made available for examination by prospective buyers. Buyers submit sealed bids on individual hogsheads; these bids are opened at a specified time and the highest bid is accepted subject to grower approval.

Since the establishment of the auction markets in Maryland in 1939, almost all of that State's tobacco has been sold on the auction floors.

Loan Programs

Since 1933, USDA has administered programs to stabilize U.S. tobacco production and assure fair prices to growers. The current legislation governing loan programs is the Agricultural Act of 1949, as amended. The program is available for all types of tobacco and must first be approved by eligible growers in a special referendum. Thereafter, referendums are held every 3 years to continue the program. Basically, growers are assigned production or marketing quotas in return for price support. All but 4 of the 24 types of tobacco produced in the United States and Puerto Rico are currently under price support programs.

Price support for eligible producers is administered by producer-owned cooperative associations acting under loan agreements with Commodity Credit Corporation (CCC). Under these agreements, CCC provides loans to these associations in the amounts necessary to pay price support to the producers, and process and store the received tobacco until it can be sold. The tobacco received by the association thus becomes the collateral for, and the means of repaying, the CCC loan. Loans are made on a crop-year basis, and it may take a number of years to dispose of the loan receipts from a particular crop. If the sale proceeds from the collateral securing the loan are insufficient to repay the loan, the unpaid balance is written off as a program cost. When proceeds from the sale exceed the loan, the net proceeds are distributed to the growers on a pro-rata basis.

Under the current program, a price support is established for each grade of tobacco. On an auction market, the grower may accept the buyer's bid or allow the tobacco to be received by the association at the support price. In either case the grower is paid by the warehouse, which, in turn, is reimbursed by the buyer or association. In the cigar leaf areas, eligible growers deliver their tobacco to the producer association where it is graded and then offered for sale.

From 1937 through fiscal year 1977, a total of \$4.6 billion has been loaned to producer associations. Realized losses during this period were \$52.1 million. As of January 1978 there were \$652.4 million of loans outstanding. All this money is expected to be repaid as the tobacco is sold.

VII. STORAGE AND AGING

Tobacco as marketed by growers is not immediately suitable for manufacturing purposes. Normally it must be redried and aged. Tobacco is usually marketed with a moisture content that would not permit it to be stored without deterioration, and this moisture level must be reduced in preparation for storage. Aging is required to improve the aroma and reduce the harshness and bitter taste of freshly cured leaf. This involves chemical change, and in many respects may be regarded as an extension of the curing process. From the standpoint of handling and preparation for storage, U.S. tobacco falls into two groupings; auction areas (types 11-37) and cigar leaf areas (types 41-62).

Auction Market Areas

Buyers transfer their purchases to processing plants where it is redried and packed for storage. The redrying process involves the almost complete removal of moisture from the tobacco and the application of a uniform moisture content throughout the leaf. This must be done quickly in the flue-cured area where sales are held during the summer. Some plants in the flue-cured area use refrigerated storage to hold unprocessed leaf.

A typical redrying machine has three compartments; #1 removes the moisture by heated air; #2 cools the leaf to prepare it to receive moisture; and #3 adds a controlled and uniform amount of moisture to the leaf. Loose leaf tobacco proceeds through the machine by conveyor belt, taking about 4 to 7 minutes to complete the passage. Tied leaf remains on the stick and is carried through the machine by a moving rack. The time required for tied leaf is 15 to 30 minutes. Upon leaving the redryer, the tobacco is immediately placed in containers for storage or export.

Since tobacco enters the redrying plant in small lots covering a large number of grades, the most



The USDA inspector grades tobacco at a flue-cured processing plant. All tobacco under price support must be re-inspected before storage.



At a tobacco processing plant, flue-cured tobacco is redried and packed.



Operations in modern tobacco processing plants are coordinated in a central control room.

demanding task facing the plant manager is to sort and blend the different grades to meet the specifications of the buyers. In addition, the tobacco must be inspected for injury and foreign matter must be removed. Modern redrying plants have a variety of sophisticated equipment specially designed for these jobs that have reduced, but not completely eliminated, the need for manual labor.

The process takes time and cannot be rushed. During the height of the buying season, many plants will operate 24 hours a day. The rate at which the tobacco can be processed for storage controls the speed of the auction sales. In the flue-cured area it is estimated that more than 300



The traditional container for storing tobacco is the wooden hogshead.



Processed tobacco also is packed in cardboard containers. Many exporting firms prefer this method of packing.

million pounds (136 million kilograms) could be sold weekly but the redrying plants can process only 85-90 million pounds (39-41 million kilograms) weekly.

Cigar Leaf Areas

These tobaccos are not redried. The leaves are normally taken directly from the curing barns to packing houses and built into bulks to undergo a fermentation process. As is the case with any tightly packed vegetable matter, the center of the bulk will become hot and the leaves will begin to deteriorate. The bulks are kept under close watch, and the temperature in the center is monitored. Every few days the bulk will be dismantled and rebuilt until all leaves have been placed in the center. The tobacco is then further sorted, sized, and packed into bales for storage in a cool place. Fermentation reduces the nicotine and moisture content of the leaf and also gives the tobacco a more uniform color. The process continues during the storage period but at a much slower rate.

Storage

Most tobacco is still packed for storage in hogsheads. These are round wooden barrel-type containers about 4 feet (120 centimeters) in diameter and 4 (120 centimeters) to 5 (150 centimeters) feet in height. Their origin goes back to medieval days where they were smaller and used for storing liquids. The container was modified for tobacco in early colonial days because it was easy to construct and could be rolled along the roadways to the ports. A modern hogshead of prepared tobacco will weigh 950 to 1,200 pounds (420.3 to 543.6 kilograms) depending on the type of tobacco and method packing. Many firms now use a smaller wooden or cardboard case containing about 450 pounds (204.1 kilograms) of tobacco. The chief advantage of the case is the ease of loading shipping containers. Rectangular cartons save as much as 28 percent in space and are easily adapted to automated loading and storage systems.

Storage warehouses are one story buildings constructed to provide good ventilation and easy access for moving the heavy hogsheads. Tobacco usually requires 1 to 3 years of aging before it is ready for manufacture. During this period the tobacco continues a slow natural fermentation which gives it a sweeter, mellower flavor.



Hogsheads of tobacco in storage.



Cigar tobacco is stored in bales.



Hogsheads of tobacco wait for shipment to a storage warehouse.

VIII. MANUFACTURING

In the colonial period the export trade was the major commercial outlet for tobacco leaf. After the Revolutionary War, small manufacturing plants began to appear, and in 1790, 29 million pounds (13 million kilograms) were used in manufacture. The product was a roll or twist form, from which portions were cut for chewing or smoking, or grated for snuff. Early in the 1800's, the manufacture of cigars began to assume importance. Imported Cuban leaf was principally used in their production. However, as domestic cigar leaf types were developed, they were combined with the Cuban imports in cigar manufacture. By 1860, 45 cigar factories were in operation.

At the outbreak of the Civil War, the manufacture of chewing tobacco had reached its peak. The leaf used in this product was a new type being grown in Virginia and North Carolina, and was the forerunner of modern flue-cured types. During the last quarter of the century, the manufacture of fine-cut chewing and smoking came into prominence in which leaf of another new type, White Burley, was used.

The manufacture of cigarettes did not assume importance until 1872 when the first practical making machine was developed. Fifteen years later annual production passed the billion mark, and by 1895 four billion cigarettes were being produced. In 1913 the blended cigarette of American and oriental tobaccos appeared on the market and became immediately popular. The growth of the cigarette industry since that time presents one of the most phenomenal aspects of tobacco history.

The Cigarette Industry

Flue-cured and burley are the principal tobaccos used in the manufacture of cigarettes along with Maryland and imported Oriental tobaccos. Great care is used in blending these tobaccos to keep the product consistent in smoking quality and taste.

After blending, conditioning agents and humectants are applied in order to improve the handling and keeping characteristics of the tobacco.

Although tobacco used in the manufacture of cigarettes is fully flavored, additional substances are added to most blends to further enhance the smoking flavor and aroma.

Modern Cigarette-making Machines

Present day cigarette-making machines employ engineering techniques which allow production of up to 4,000 cigarettes per minute with the assurance of uniform product quality.

Cigarette paper is supplied to the cigarette-making machine in large reels. Tobacco is fed to the machine by a pneumatic conveying system and is metered in a uniform stream onto the cigarette paper to form a continuous rod.

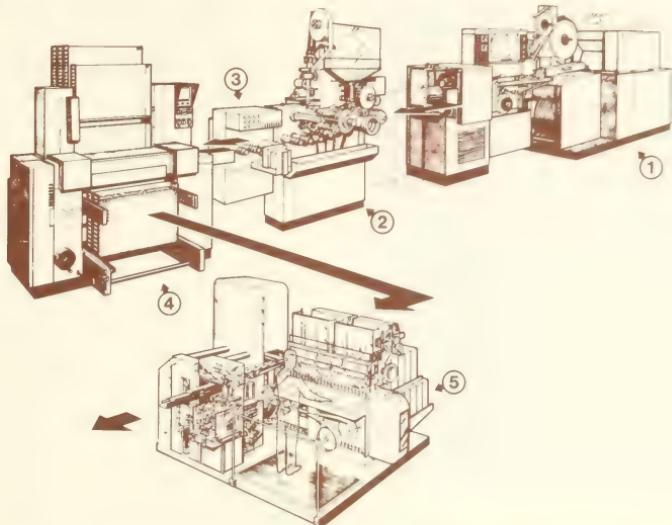
This continuous rod is sealed lengthwise and then cut into the required lengths for the particular brand being produced. In the case of nonfilter cigarettes, these cut cigarettes are placed by the machine into suitable containers for delivery to a packaging system.

Filter cigarettes are produced in exactly the same manner as regular cigarettes up to the point of cutting the continuous rod into individual lengths.

Additional machinery is linked directly to the cigarette-making machine to receive the cut lengths of tobacco rod. A measured length of filter material is placed between the two sections of finished cigarettes. A "tipping" paper material, usually either of cork or opaque white appearance, is wrapped around the filter, sealing it to the ends of the two cigarettes. This double cigarette, with the filter in the center, is then cut exactly through its middle to form individual filter-tipped cigarettes, which are automatically placed into suitable transfer containers for delivery to a packaging system.

Modern cigarette-making machines are fitted with control units which monitor and automatically correct the weight of the tobacco used in the cigarettes produced and also inspect each cigarette for quality defects. Cigarettes which do not meet rigid quality standards are automatically rejected.

The cigarette industry currently employs about 38,000 production workers. Additional thousands are employed in management, accounting, sales, and so forth. Around 666 billion cigarettes were manufactured in 1977, mostly for domestic consumption. However, about 67 billion were exported to more than 70 foreign countries throughout the world, and another 11 billion went to the Armed Forces overseas to ship stores, as shipments to Puerto Rico, and other sources. Consumers spent about \$16 billion for the 620 billion cigarettes consumed in the United States in 1977. Per-capita consumption for persons 18 years and over is about 203 packs annually. The Federal Government receives about \$2.5 billion annually from the 8-cents-per-pack excise tax rate, and more than 3 billion dollars is collected yearly among the 50 States, the District of Columbia, and local governments. The State tax rates in 1977 ranged from 2 cents to 21 cents per pack.



Steps in the manufacture of cigarettes.

1. The making machine combines tobacco and paper into a continuous rod that is cut into individual cigarettes.
2. The tipping machine receives the cigarettes and attaches the filter.
3. An inspection device monitors each cigarette and performs a series of tests for density, weight, length, and circumference.
4. Finished cigarettes are collected in trays that are automatically fed to the packing machine.
5. The packing machine puts the correct number of cigarettes into each pack and, after inspection, wraps them for delivery to other machines for packing into cartons and crates.

The Cigar Industry

The cigar industry in this country began in homes on tobacco-growing farms. Shops employing skilled cigarmakers began to appear after 1800, and larger factories gradually evolved from these. The making of cigars on farms eventually disappeared, but the practice of making them by hand in the small shops persisted as an important phase of the industry throughout most of the 19th century.

With the perfection of cigar-making machinery during this century, the industry has rapidly evolved into fewer and larger establishments. In the last 25 years alone, the number of factories producing cigars has been reduced from 1,800 to less than 200. All cigars, except the most expensive are now made by machines.

There are three components of the cigar—filler, binder, and wrapper. For the manufacture of some cigars, imported leaf is used for part or all of

the cigar. Presently, considerably less than one-half of the cigar leaf used in the industry is domestically grown.

Reconstituted Tobacco Sheet

"Reconstituted sheet" is now used as a substitute for natural cigar binders on most cigars, and an increasing percentage also have reconstituted wrappers. Those with reconstituted wrappers often do not have the inner binder.

In manufacturing this material, tobacco is ground into a fine powder, mixed with a cohesive agent, and rolled into a flat sheet of uniform thickness and quality. The moisture is controlled throughout all the various stages of production. The finished material has the taste and aroma of natural leaf and a consistent burning quality.

The use of reconstituted sheets results in substantial savings both in leaf and labor costs. Natural leaf binders have to be nearly perfect, and



A modern cigar-making machine.

are therefore costly. Generally each half of a natural leaf will yield two or three binder pieces, and the trimmings go largely into the manufacture of loose-leaf chewing, a lower value outlet. In tobacco sheet, the entire binder leaves are used, even though they may be broken or damaged. There is no waste or trimmings in cutting the binder.

The savings in labor cost, as well as in leaf cost, is also important in the development of this processed sheet for cigar-binder purposes. Natural binders must be hand-fed into the cigar-making machine, but the sheet is fed automatically from a spool, thus reducing the workers required from 2 to 1 on most machines.

The use of sheet as wrappers is not as widespread as binders, but the potential saving in this area is also considerable, both in leaf and labor costs.

The output of cigar-making machines can vary between 750 to well over 10,000 per hour depending on the size and shape of the cigar, the degree of finish desired, and the type of filler and binder leaf used.

A few of the higher-priced cigars are still handmade. The filler leaves are blended and shaped, and wrapped with binder leaves. Then it is placed into the lower half of a mold block containing usually 20 individual molds the shape and size of the finished cigar. The upper half is placed over the mold block and held in position under pressure for 25-45 minutes. The molded bunches are taken out one at a time, and the wrapper rolled

on. Wrappers must be the finest of the tobaccos used in cigars, of good color, and without imperfections.

The wrapper strip is wrapped spirally around the cigar, beginning at the base, and tapered off to form the head. The end of the wrapper is fastened with a vegetable gum paste, or similar material.

In making the very finest handmade cigars, no form or mold is used. These cigars are entirely shaped, sized, and rolled by hand, on a specially made board or block fitted with a knife for clipping the head and the end. A high degree of skill and dexterity is required in making uniformly high grade handmade cigars.

Cigars are normally wrapped individually in cellophane. A large proportion are now packaged in "five-pack" cellophane-wrapped containers for handy merchandising by supermarkets, and other outlets. However, many are still packed in boxes of 25 and 50. The cigars are carefully packed according to color shade, so that each box will be uniform in color.

About 13,000 persons currently are employed in cigar factories. Currently about 5 billion cigars are produced annually in the United States and Puerto Rico.

Approximately 60 million pounds (27 million kilograms) (farm-sales weight) of domestic leaf are used annually and another 40 million pounds (18 million kilograms) are imported. Considerably less than half of the domestic cigar leaf is used in cigar manufacture. The balance being used in chewing and smoking tobacco and snuff.

The Manufactured Tobacco Industry

The products of this industry are chewing tobacco, smoking tobacco, and snuff, which are produced in around 37 factories. Since 1918, when over 1,800 factories were operating, the number of factories has steadily declined. As consumer tastes turned to cigarettes, all three products declined until 1970. Since 1970, chewing tobacco has increased in use, snuff production has remained stable, but smoking tobacco has continued to decline.

Chewing Tobacco

The manufacture of chewing tobacco was at a high level through 1918. Since that year, which marked the beginning of the most rapid expansion of the cigarette industry, this product has sharply declined. Currently, four types of chewing tobacco products are recognized including plug, twist, fine-cut, and loose-leaf.

Nearly all types of tobacco are used in the manufacture of chewing, even those that are primarily cigar and cigarette types. Although both flue-cured and burley are considered cigarette types, both owe their early use to the chewing tobacco

industry, and continue to furnish some leaf for the manufacture of these products. The dark air-cured and, to some extent, fire-cured types go into various chewing forms. Cigar leaf is the principal kind of tobacco used in loose leaf chewing products.

Plug is made of leaf tobacco pressed into flat cakes after the stems have been removed. The plug consists of two parts, filler and wrapper. Fillers consist mainly of the heavier grades of flue-cured, burley, dark air-cured, and some fire-cured tobacco. The wrappers are leaves carefully selected for fine quality and appearance, but some brands use reconstituted tobacco as wrappers. Various flavoring compounds are added to the tobacco, such as licorice, maple sugar, and honey. Two distinct kinds of plug are made—one flat or thin and moderately sweetened, and the other thick and heavily sweetened.

Twist tobacco probably originated on the farm where the grower found it convenient to make his leaf tobacco up into twists for future use. Twist is similar to that product known as roll tobacco, which was the very earliest form of manufactured tobacco. In making commercial twist, the leaf is stemmed and twisted into small rolls and folded. Most twist is treated with the same kind of flavoring preparations used for making plug. One-sucker, burley, and fire-cured are the types of leaf used in the manufacture of twist. Hand labor is used to a large extent in the small twist factories located in producing areas, but machine methods are used by larger firms.

Fine-cut tobacco, as indicated by the name, is made of finely shredded leaf, cut much the same as for the manufacture of cigarettes. However, some forms may be so finely cut as to resemble moist snuff. Some of it is heavily flavored, like the thick plug. Burley and Green River are the principal leaf types used.

Loose-leaf chewing, unlike most other chewing and pipe-smoking products, is made almost entirely of cigar-leaf tobacco not usually suitable for cigar manufacture. Practically all the stems and some of the coarser fibers are removed before processing. Loose leaf chewing is also an outlet for broken leaves and "cuttings" from cigar manufacture. The product consists of irregular fragments or flakes of tobacco leaf, about $\frac{1}{4}$ to 1 inch (6.35 to 25.4 millimeters) in diameter, and sold in small packages. It is classified in the trade as sweet (heavily flavored) and plain.

Smoking Tobacco

Smoking tobacco commonly refers to pipe tobacco, although considerable quantities of tobacco so classified are used in hand-rolled cigarettes. Smoking tobacco is manufactured in many forms, such as granulated, plug cut, long

cut, cube cut, and others. The most widely used type of tobacco is burley.

Most smoking tobacco is treated by the addition of flavoring materials, which contribute to the mildness and aroma of the smoke and help control loss of moisture.

Granulated is one of the oldest and simplest forms of smoking tobacco. It is made mostly of burley and flue-cured types of leaf. The product consists of stemmed leaf broken into small flakes with added flavoring. Some rolled, flattened, and cut stems may also be added. Granulated smoking tobacco is popular for hand-rolled cigarettes. This form of tobacco is usually packaged in small cotton bags.

Long cut is cut coarser than fine-cut chewing tobacco. Long cut is usually used in mixtures of roll-your-own smoking tobacco.

Plug cut is made much the same way as plug chewing tobacco, and then sliced to desired shapes. Its use today in the United States is very small.

Smoking tobacco (except granulated) is usually packaged in tins or moisture-proof pouches that can fit in coat pockets.

Snuff

In the 17th and 18th centuries, its use was considered one of the distinguishing marks of the gentleman. Snuff-taking enjoyed a degree of elegance for about 200 years, but in more recent times its forms of use and the classes of users have changed. Contrary to popular belief, very little snuff today is sniffed or used through the nose. Most of it is "dipped," a term commonly meaning that it is used in the mouth (tucked between the lower lip and the gum) as a variation of chewing tobacco.

Use of snuff is often heavy in industrial plants where smoking cannot be permitted.

Production of snuff in the United States has never been large, but even today about 25 million pounds (11 million kilograms) are produced annually. Snuff is made principally from fire-cured tobacco with a small quantity of dark air-cured tobacco also going into its manufacture. Some of the leaf is stemmed, but for the most part, the entire leaf is used and often additional stems are added.

Some of the principal forms of snuff are fine and coarse, dry and moist, plain and toasted, and salted, sweetened, flavored and scented. The different kinds are known by such names as Scotch, dry (strong or sweet) and moist (coarser than dry snuff and closely resembling fine-cut chewing).

The chewing, smoking and snuff industry currently employs less than 3,000 production workers. In 1977, the following amounts in

pounds (kilograms) of the different products were manufactured: chewing tobacco, 90 million pounds (41 million); smoking tobacco, 41 million (19 million); and snuff, 25 million (11 million).

IX. INTERNATIONAL PRODUCTION AND TRADE

Tobacco is produced and consumed in practically every country and is an important international trade item. World production was over 12 billion pounds (5.4 billion kilograms) in 1977; world exports were 2.8 billion pounds (1.3 billion kilograms). The People's Republic of China is believed to be the leading producer with output of nearly 2.2 billion pounds (1 billion kilograms). The United States follows closely with 2.0 billion pounds (0.9 billion kilograms) of production. Other important producing countries include Argentina, Brazil, Bulgaria, Canada, Greece, India, Italy, Japan, the Philippines, Poland, Rhodesia, South Korea, Turkey, and the USSR. Most producing countries grow more than one type of leaf, and many supplement domestic production with imports of complementary types for blending in products to satisfy consumer tastes.

Over the years, changes in international trade in tobacco have reflected changes in consumer preferences for different types of manufactured tobacco products. The popularity of snuffing in the 18th century gave way to pipe and cigar smoking which, in turn, gave way to strong and continuing preference for cigarettes. The demand for leaf tobacco shifted accordingly from dark tobaccos in earlier years to flue-cured, light air-cured, and oriental types for use in cigarettes in more recent years. Today these light cigarette leaf types account for more than two-thirds of world tobacco production and trade.

International trade in tobacco is affected by governmental policies and institutions. Government tobacco monopolies, State trading, import duties and quotas, restrictions upon the use of foreign exchange, bilateral and/or preferential trade agreements, export subsidies, "mixing" regulations, internal taxes and customs unions, such as the European Economic Community all have a direct, and sometimes restrictive, effect on tobacco trade.

The United States, throughout its history, has been the world's most important tobacco producer and exporter. About one-third of U.S. production moves into the export market. The major portion of this leaf is high-quality flue-cured and burley tobacco for manufacturing American-type blended cigarettes.

The United States currently is one of the largest



Tobacco samples for a prospective buyer are obtained by "breaking" a hogshead of tobacco.

leaf tobacco importers, taking about 11 percent of world leaf imports. The nine countries of the European Community take over 40 percent of the total world imports.

World trade in manufactured tobacco products is considerably less important than trade in leaf. The protectionist trade policies of most countries favor domestic tobacco manufacturing industries. Cigarettes are the most important tobacco product in international trade, but cigarette trade volume is small in comparison with total cigarette production and consumption. Five countries—Bulgaria, Switzerland, the United Kingdom, the United States, and West Germany—supply more than three-fourths of world cigarette exports.

The predominant factor influencing the world tobacco industry today is the steadily increasing output of cigarettes, particularly American-type blends, throughout much of the world. The effects of this trend are apparent in the increasing production, trade and consumption of cigarette-type tobaccos.

U.S. Exports of Unmanufactured Tobacco

Tobacco has been one of the United States' most important agricultural export commodities since earliest colonial times. The overseas trade in tobacco was of such importance that export statistics represented the only apparent record of production from 1618 to 1788. Since 1870, tobacco exports have never fallen below 200 million pounds (90.7 million kilograms) annually and often have been above 500 million pounds (226.8 million kilograms).

The total value of United States unmanufactured leaf and products exported in 1977 was \$1.7 billion, making a significant contribution to the U.S. balance of trade.

The European Economic Community, a Common Market comprised of Belgium-Luxembourg, Denmark, France, Ireland, Italy, the Netherlands, the United Kingdom, and West Germany, is currently the major market area for U.S. tobacco, taking about 40 percent of U.S. leaf exports. Japan is currently the largest individual importer of U.S. tobacco. Other important markets are Australia, Egypt, the Philippines, Sweden, Switzerland, Syria, Taiwan, and Thailand.

All types of leaf produced in the United States enter into the export trade. But flue-cured tobacco is the predominant type exported, currently accounting for nearly 80 percent of total leaf exports. Burley leaf, the second major type in U.S. production, is also used in blended cigarettes in a number of foreign countries; about 8 to 10 percent of this type is normally exported. Fire-cured tobacco led in production and exports during the 19th century and until World War I. The decline in pipe smoking, chewing, and snuff use led to the great expansion in exports, first of flue-cured, and now burley.

U.S. Exports of Tobacco Products

The cigarette is by far the leading manufactured tobacco product exported from the United States. Relatively small quantities of smoking tobacco, chewing tobacco, and cigars also go into the export market. U.S. manufactured cigarettes go to many foreign countries with the leading ones being Antilles, Belgium-Luxembourg, Hong Kong, Iran, Japan, Kuwait, Netherlands,

Saudi Arabia, Spain, and West Germany. In recent years, bulk smoking tobacco, blended and prepared for manufacture into cigarettes, has been exported in significant quantities.

Black Fat is a trade term applied to a unique tobacco form packed exclusively for export. Most of it goes to Benin, Cameroon, Nigeria, and other West African countries. The product consists of one sucker dark air-cured leaf and Kentucky and Tennessee fire-cured. The tobacco is carefully selected, particularly as to length, and tied onto hands of 4 to 6 leaves each. The leaves are put through a series of "sweats" until they are very dark and are then packed under pressure. The final product is sprayed with a mineral oil to add sheen and packed in 1,000 pound crates for shipment. It is used mainly for pipe smoking by native populations but may be used as chewing tobacco or made into snuff.



A USDA marketing specialist discusses a sample of U.S. tobacco with Chinese tobacco specialists. Foreign buyers frequently request official certification of their purchases.



Hogsheads of tobacco are loaded on a ship for export.

U.S. Imports of Unmanufactured Tobacco

The United States ranked third among world importers of unmanufactured tobacco in 1977. About one-half of these imports were the oriental types used for blending in cigarettes. Most of this tobacco comes from Greece and Turkey. Imports of flue-cured and burley leaf are increasing and

accounted for one-third of the imports during 1977 with Brazil, Mexico and South Korea being the primary suppliers. Cigar-leaf types make up most of the remaining imports. The Dominican Republic is the leading source of cigar type tobaccos, followed by Colombia, Indonesia, and the Philippines.

REFERENCE GUIDE FOR TOBACCO INFORMATION IN THE U.S. DEPARTMENT OF AGRICULTURE

Agency	Program responsibilities	Types of publications
Agricultural Marketing Service Tobacco Division	Inspection and grading service, development of grade standards, training and demonstrations, market news, stocks report, Plant and Seed Exportation Act.	Marketing news reports (field) Market reviews (annually) Stocks reports (quarterly) Annual report on statistics
Agricultural Stabilization and Conservation Service: Price Support and Loan Division	Policy and legislative proposals; national loan levels, quotas, and allotments; grade loan rates.	Statistical information on programs
Production Adjustment Division	Issue regulations based on the Agricultural Adjustment Act of 1938, as amended; provide procedures and guidance for administration of the tobacco program through state and county offices.	Statistical information on programs
Producer Associations Division	Administration of price support program through grower cooperatives.	Statistical information on programs
Foreign Agricultural Service: Tobacco and Cotton Division	Promotion and expansion of exports, participation in formal trade negotiations on access to markets and tariff regulations, maintains a global reporting and analysis network of attaches' analysis of exports and imports.	Foreign crops and markets Foreign agriculture circul- ars (Foreign Tobacco [FT] series) Special reports
Office of the General Sales Manager	PL 480 (Food for Peace) export sales of Commodity Credit Corporation (CCC) stocks, export credit sales, export sales report.	Quarterly report, annual report on PL 480, and Weekly Export Sales report
Economics, Statistics, and Cooperatives Service:	Economic and statistical analyses of tobacco production, processing and marketing.	The Tobacco Situation, Outlook, and special reports
Agricultural Estimates Division	Estimates on acreage, yield, production, and price on tobacco; parity prices.	Crop report Agricultural prices
Science and Education Administration Plant Genetics and Germ Plasm Institute (Tobacco Laboratory)	Research and testing concerning tobacco production, breeding, disease, and quality investigations.	Technical bulletins, Farmers' bulletins, USDA handbooks, material for extension circul- ars, State Experiment Station bulletins, scientific journals

Information Available

The volume of published material on tobacco is enormous. The serious student can find some pamphlet or book on almost every facet of the industry.

Therefore, the following list is intended to direct the interested reader to sources of material, rather than individual publications.

Government publications from the following institutions:

University of Kentucky, Extension Service, Lexington, Ky. 40506

N.C. State University, Extension Service, Raleigh, N.C. 27607

Virginia Polytechnic Institute and State University, Extension Service, Blacksburg, Va. 24060

University of Tennessee, Extension Service, Knoxville, Tenn. 37916

University of Maryland, College Park, Md. 20740

Clemson University, Clemson, S.C. 29631

Florida Department of Agriculture, Tallahassee, FL. 33602

Connecticut Agricultural Experiment Station, New Haven, Conn. 06504

University of Georgia, Athens, Ga. 30601

U.S. Department of Agriculture, Washington D.C. 20250

Books of general interest:

Gage, Charles E., American tobacco types, uses, and markets, U.S. Department of Agriculture Cir. 249 (Rev. 1942).

Garner, Wightman W., The Production of Tobacco, The Blakiston Co., Philadelphia, Pa. (Rev. 1951).

Hawks, S. N., Jr., Principles of Flue-cured Tobacco Production, N.C. State University, Raleigh, N.C., 1970.

Akehurst, B.C., Tobacco, Humanities Press, Inc. (1968), New York

Middleton, Arthur Pierce, Tobacco Coast, Mariners' Museum (1953), Newport News, Va.

Brooks, Jerome E., The Mighty Leaf, Little Brown and Co. (1952), New York.

Robert, Joseph C., The Tobacco Kingdom, Duke University Press (1938), Durham, N.C.

Robert, Joseph C., The Story of Tobacco in America, Alfred A. Knopf (1949), New York.

Tilley, Nannie May, The Bright Tobacco Industry, 1860-1929, University of North Carolina Press (1948), Chapel Hill, N.C.

Heimann, Robert K., Tobacco and Americans, McGraw-Hill (1960), New York

Wagner, Susan. Cigarette Country. Tobacco in American History and Politics, Praeger Publishers (1971), New York

Sherman, Milton M., All About Tobacco. Sherman National Corp. (1970) New York

John, Raymond, Tobacco Dictionary, Philosophical Library (1954) New York

Other sources of information

Howard S. Cullman Library, Tobacco Merchants Assn. of the U.S., Statler-Hilton, Room 63, 7th Avenue and 33rd Street, New York, N.Y. 10001

The Tobacco Institute, Inc., 1776 K Street, N.W., Suite 1200, Washington, D.C. 20006

Tobacco Associates, Inc., 1101 17th Street, N.W., Washington, D.C. 20036

Tobacco Tax Council, Box 8269, Richmond, Va. 23226

National Assn. of Tobacco Distributors, 58 East 79th St., New York, N.Y. 10021

Cigar Assn. of America, Inc., Suite 410, 1120 19th St., N.W. Washington, D.C. 20006

Smokeless Tobacco Council, Inc., P.O. Box 70, Peekskill, N.Y. 10566

National Tobacco-Textile Museum, P.O. Box 541, Danville, Va. 24541

